



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,305	04/13/2004	Richard Schenker	10559/927001/P18716	5971
20985	7590	05/10/2005	EXAMINER	
FISH & RICHARDSON, PC 12390 EL CAMINO REAL SAN DIEGO, CA 92130-2081			CHOI, WILLIAM C	
			ART UNIT	PAPER NUMBER
			2873	

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/824,305	Applicant(s) SCHENKER, RICHARD	
	Examiner William C. Choi	Art Unit 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11, 13, 18-23 and 26-28 is/are rejected.
- 7) ☒ Claim(s) 10, 12, 14-17, 24, 25, 29 and 30 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1204</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Information Disclosure Statement

Receipt of the Information Disclosure Statement (IDS) with copies of the references cited therein, was received on 12/15/2004. An initialized copy of the IDS is enclosed with this office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-9, 11, 13 and 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by White (U.S. 4,302,079).

In regard to claim 1, White discloses a lithography system (column 1, lines 7-9, Figure 3), comprising: a polarization modulator configured to change light which is applied thereto from a first polarization profile to a second polarization profile different than the first polarization profile (column 5, lines 23-41, Figure 3, "31"); and a stress modulator in communication with the polarization modulator to apply stress to the polarization modulator (column 5, lines 45-46, Figure 5, "65, 66").

Regarding claim 2, the system of White inherently includes a light source positioned to transmit light to the polarization modulator, this being reasonably assumed

Art Unit: 2873

from White disclosing radiation passing through the polarization modulator (column 5, lines 33-34).

Regarding claim 4, White discloses said system further including one or more optical components positioned between the light source and the polarization modulator (column 3, lines 41-43, Figure 3, "34, 35").

Regarding claim 5, the system of White inherently includes an illuminator, this being reasonably assumed from White disclosing radiation passing through the polarization modulator (column 5, lines 33-34).

Regarding claim 6, White discloses wherein the polarization modulator is integrated with the illuminator (Figure 3, "31").

Regarding claim 7, White discloses wherein the polarization modulator is positioned along an optical path between the illuminator and an imaging plane (Figure 3, "31").

Regarding claim 8, White discloses wherein the polarization modulator is positioned at a pupil plane of the lithography system (Figure 3, "31").

Regarding claim 9, White discloses wherein the stress modulator is configured to apply stress to an outer surface of the polarization modulator to obtain a polarization profile at an imaging plane (column 5, lines 45-46, Figure 5, "65, 66").

Regarding claim 11, White discloses wherein the lithography system comprises a deep ultraviolet system (column 1, lines 7-9).

Regarding claim 13, White discloses wherein the stress modulator is configured to apply stress using compression (column 5, lines 31-32).

In regard to claim 18, White discloses a method of modifying the polarization of light, comprising: applying stress to a polarization modulator; receiving light of a first polarization state in the polarization modulator; modifying the polarization of light within the polarization modulator; and transmitting light of a second polarization state different than the first polarization state from the polarization modulator (column 5, lines 23-49).

Regarding claim 19, White discloses wherein receiving light of the first polarization state comprises receiving light inherently generated with a light source (column 4, lines 62-64).

Regarding claim 20, White discloses wherein the transmitting light comprises transmitting light to a surface of a substrate (column 3, lines 33-36, Figure 3, "23").

Regarding claim 21, White discloses wherein transmitting light to a surface of a substrate comprises transmitting patterning light to a surface of a wafer to be patterned (column 4, lines 33-36, re: "mask").

Claims 18, 22, 23 and 26-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Martin (U.S. 6,324,003 B1).

In regard to claim 18, Martin discloses a method of modifying the polarization of light, comprising: applying stress to a polarization modulator; receiving light of a first polarization state in the polarization modulator; modifying the polarization of light within the polarization modulator; and transmitting light of a second polarization state different than the first polarization state from the polarization modulator (column 7, line 55 – column 8, line 17).

Regarding claim 22, Martin discloses said method comprises detecting a parameter related to one or more characteristics of the transmitted light (column 7, line 67 – column 8, line 17, Figure 7, “709”).

Regarding claim 23, Martin discloses said method comprises applying a different stress to the polarization modulator based on the parameter column 7, line 67 – column 8, line 17, Figure 7, “709”).

In regard to claim 26, Martin discloses a polarization control apparatus (column 7, line 55 – column 8, line 17, Figure 7), comprising: a polarization modulator configured to change light which is applied thereto from a first polarization profile to a second polarization profile different than the first polarization profile (column 7, lines 57-64, Figure 7, “408”); a stress modulator in communication with the polarization modulator to apply stress to the polarization modulator (column 6, lines 56-59; column 7, lines 5-9; column 8, lines 14-17); a controller configured to receive a signal based on a parameter related to one or more characteristics of the transmitted light, the controller in communication with the stress modulator and configured to control the stress (column 7, line 67 – column 8, line 17, Figure 7, “709”).

Regarding claim 27, Martin discloses said system including a light sensor positioned to receive at least a portion of the transmitted light, the light sensor in communication with the controller (column 7, line 67 – column 8, line 17, Figure 7, “709”).

Regarding claim 28, Martin discloses wherein the signal based on the parameter is a signal from the light sensor (column 7, line 67 – column 8, line 17, Figure 7, “709”):

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over White as applied to claim 1 above, and further in view of Martin.

Regarding claim 3, White discloses as set forth above but does not specifically disclose wherein the light source is configured to transmit light having a wavelength selected from the group consisting of 157 nm, 193 nm, and 248 nm. However, White discloses wherein the light source of his invention transmits at 215 nm and teaches wherein his system can be reoptimized for other desirable wavelengths (column 4, lines 56-60). Also, within the same field of endeavor, Martin teaches wherein it is desirable in lithography systems, using stress modulators (i.e. plates), to use light of the claimed wavelengths to achieve circuit features below 0.25 μm .

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the light source of White to transmit light at the claimed wavelengths since White teaches wherein his system can be reoptimized for other desirable wavelengths and Martin teaches wherein it is desirable in lithography systems, using stress modulators (i.e. plates), to use light of the claimed wavelengths to achieve circuit features below 0.25 μm .

Allowable Subject Matter

Claims 10, 12, 14-17, 24, 25, 29 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 10: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein the polarization profile exhibits substantially azimuthal symmetry.

The prior art fails to teach a combination of all the claimed features as presented in claim 12: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein the lithography system comprises an immersion lithography system.

The prior art fails to teach a combination of all the claimed features as presented in claim 14: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein the stress modulator is configured to apply stress using expansion.

The prior art fails to teach a combination of all the claimed features as presented in claim 15: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein the stress modulator is configured to apply stress by heating at least one of the stress modulator and the polarization modulator.

The prior art fails to teach a combination of all the claimed features as presented in claim 16: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein the stress modulator is configured to apply stress by cooling at least one of the stress modulator and the polarization modulator.

The prior art fails to teach a combination of all the claimed features as presented in claim 17: a lithography system comprising a polarization modulator and a stress modulator as claimed, specifically wherein said system further comprises another stress modulator in communication with another polarization modulator, the another stress modulator to apply stress to the another polarization modulator.

The prior art fails to teach a combination of all the claimed features as presented in claim 24: a method of modifying the polarization of light comprising detecting a parameter related to one or more characteristics of transmitted light as claimed, specifically wherein the parameter is based on the second different polarization profile.

The prior art fails to teach a combination of all the claimed features as presented in claim 25: a method of modifying the polarization of light comprising detecting a parameter related to one or more characteristics of transmitted light as claimed, specifically wherein the parameter is based on the pattern.

The prior art fails to teach a combination of all the claimed features as presented in claim 29: a polarization control apparatus comprising a controller configured to receive a signal based on a parameter in communication with a stress modulator as claimed, specifically wherein the parameter is based on the second different polarization profile.

The prior art fails to teach a combination of all the claimed features as presented in claim 30: a polarization control apparatus comprising a controller configured to receive a signal based on a parameter in communication with a stress modulator as claimed, specifically wherein the parameter is based on the pattern.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Choi whose telephone number is (571) 272-2324. The examiner can normally be reached on Monday-Friday from about 9:00 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

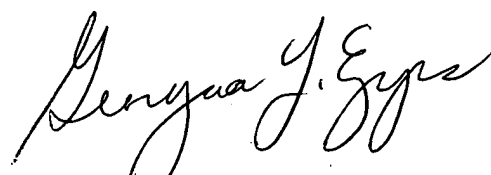
Application/Control Number: 10/824,305

Page 10

Art Unit: 2873

W.C.

William Choi
Patent Examiner
Art Unit 2873
May 5, 2005


Georgia Epps
Supervisory Patent Examiner
Technology Center 2800